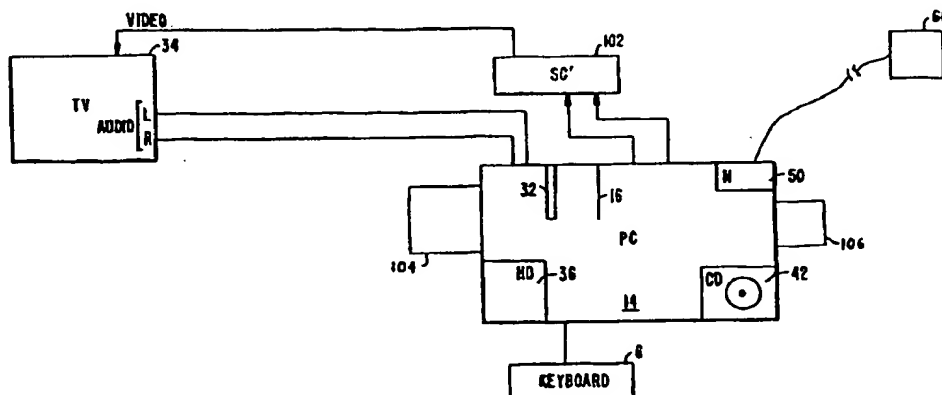




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(54) Title: METHOD AND APPARATUS FOR PREVIEWING PRODUCT INFORMATION AND EFFECTING A TRANSACTION



## (57) Abstract

A kiosk includes storage medium (42) for storing audio and full-motion video information about a plurality of products, and means (34) for displaying the audio and full-motion video information. A decoder (104) is provided by which a user may enter personal information. A user interface (6) allows a consumer to enter various information and includes means for selecting a first product option from a plurality of product options, means for selecting a first transaction option from a plurality of transaction options, and means for entering a personal identification number. A data link (50) is provided for transmitting information to and from an external data system (60). A processing means (14) is included for processing information entered by means of the decoder and user interface, as well as information transmitted from the external data system. The processing means is coupled to the storage medium, the display means, the user interface, the decoder, and the data link.

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5                    METHOD AND APPARATUS FOR PREVIEWING  
PRODUCT INFORMATION AND EFFECTING A TRANSACTION

10

                    BACKGROUND OF THE INVENTION

15                    The present invention relates to a method and  
apparatus for previewing information about a plurality of  
products and for effecting a transaction with respect to those  
products.

                    Providers of goods and services are constantly  
20                    devising strategies for educating consumers about their  
products. This is especially true for providers of goods and  
services which are complex and/or numerous. However, given  
the attention span of the average consumer, and the extent to  
which consumers are inundated with sophisticated, high-tech  
25                    advertising, the task has become increasingly difficult. One  
recent solution to this problem is described in U.S. Patent  
No. 5,084,768 to Stern for METHOD AND APPARATUS FOR PREVIEWING  
RECORDED INFORMATION. In Stern, a method and apparatus are  
provided with which a consumer may select and preview a full-  
30                    motion video and audio presentation about one or more of a  
plurality of products. Specifically, the apparatus of Stern  
is a music/video preview display system in which the consumer  
is presented with a variety of musical selections represented  
by, for example, album cover illustrations on a backlit key  
35                    pad. The consumer chooses a particular music selection by  
depressing the appropriate key, and the system retrieves the  
audio and corresponding video information from its optical  
disc memory. The system has two optical discs and two disc  
players to reduce access time to prevent consumers from

getting bored and wandering off. The system then presents the consumer with the audio selection accompanied by, for example, an associated music video.

Another solution to the above-described problem is described in a copending U.S. Patent Application Serial No. 08/085,692 for METHOD AND APPARATUS FOR SELECTIVELY PREVIEWING COMBINED AUDIO AND VISUAL INFORMATION, filed on June 29, 1993, the entire specification of which is herein incorporated by reference. The application provides a system with similar features as that of Stern, but with many significant improvements. For example, the audio and full-motion video information is digitally compressed and stored in a compact disc read-only-memory (CD-ROM). The information is retrieved by a digital video interface system which rapidly decompresses the selected information, thereby further reducing access time. Additionally, the system is capable of simultaneously displaying textual information and full-motion video on the display screen. The textual information may include, for example, pricing and other retail information for a specific location. Furthermore, the system is capable of monitoring consumer selections for the purpose of maintaining proper inventories and developing marketing strategies.

Unfortunately, neither of the above-described systems is capable of effecting a sale. Because the ultimate goal of the retailer is to sell the product to the consumer, a system is needed which not only allows the consumer to preview product information, but also allows the consumer to purchase the product at the time and place of previewing.

#### SUMMARY OF THE INVENTION

A method and apparatus are provided for previewing information about a plurality of products and for effecting a transaction with respect to those products. More specifically, a kiosk is provided with which consumers may select audio-visual presentations about a variety of products including computer software, financial, travel, and entertainment related products and services. Once the

consumer has previewed product information, she may then insert an encoded card into the apparatus, enter her personal identification number (PIN), and select a transaction with regard to a specific product. The encoded card may be a  
5 magnetically encoded card such as a credit card or a bank debit card. Alternatively, the user may present an identification card (e.g., a driver's license), or a business card which may be read by the apparatus by means of an optical scanner. Transaction options might include a request for  
10 promotional material regarding the product to be sent to the consumer's address, a request for a printout of promotional information, or an immediate purchase of the featured product.

In one embodiment, the kiosk includes a storage medium for storing audio and full-motion video information  
15 about a plurality of products, and means for displaying the audio and full-motion video information. A decoder is provided for reading encoded information from cards inserted by consumers. A user interface allows a consumer to enter various information and includes means for selecting a first  
20 product option from a plurality of product options, means for selecting a first transaction option from a plurality of transaction options, and means for entering a personal identification number. A data link is provided for transmitting information to and from an external data system.  
25 A processing means is included for processing information entered by means of the decoder and the user interface, as well as information transmitted from the external data system. The processing means is coupled to the storage medium, the display means, the user interface, the decoder, and the data  
30 link.

In a specific embodiment, the decoder comprises a magnetic card reader for reading information from magnetically encoded cards such as, for example, credit cards, bank debit cards, or, according to one embodiment, a PICS Previews access  
35 card. However, it will be understood that a wide variety of technologies are available which may easily be used in place of a magnetic card reader without departing from the scope of the invention. For example, cards having programmable

integrated circuits disposed thereon are available for such applications. Thus, electronic devices for reading information stored in such integrated circuits may be employed. Optical scanners may also be employed to read visual data on, for example, driver's licenses, business cards, or cards having data optically encoded thereon.

In a more specific embodiment, the storage medium comprises at least one CD-ROM. The storage medium may also include a hard disk, alone or in combination with the CD-ROM.

In another embodiment, the displaying means comprises at least one video monitor and at least one audio speaker. In yet another embodiment, the magnetic card reader reads magnetically coded information from credit cards and debit cards. In still another embodiment, the external data system comprises a data base containing consumer information which may be accessed by the processing means by means of the data link using information obtained from the decoder.

In one embodiment, the means for selecting a first product option comprises a first plurality of touch sensitive graphics, each graphic being a symbolic representation of a product option. In another embodiment, the first plurality of touch sensitive graphics are backlit. In still other embodiments, the symbolic representations represent entertainment, financial, or travel products and services.

In one embodiment, the means for selecting a first transaction option comprises a second plurality of touch sensitive graphics, each graphic being a symbolic representation of a transaction option. In another embodiment, the second plurality of touch sensitive graphics are backlit. In still another embodiment, the symbolic representations comprise transaction options which include sending information to the user's address, on-location printing of promotional information, and purchasing products and services. The symbolic representations for each set of touch sensitive graphics may include both pictures and alphanumeric text.

In one embodiment, the means for entering a personal identification number comprises a third plurality of touch

sensitive graphics, each graphic comprising at least one alphanumeric symbol. In a specific embodiment, the third plurality of touch sensitive graphics are backlit.

5 A method for previewing information about a plurality of products and effecting a transaction is also provided. The consumer is presented with a plurality of product options. In response to the selection of a first product by the consumer, a first selection signal is generated. In response to the first selection signal an  
10 audio-visual presentation about the first product is displayed. In response to the insertion of an encoded device (in one embodiment, a magnetically encoded card) by the consumer, a scanning signal is generated. In response to a personal identification number entered by the consumer, a  
15 personal identification signal is also generated. The personal identification number is then verified in response to the personal identification signal, and electronic information about the consumer is obtained based upon the scanning signal. The consumer is also presented with a plurality of transaction  
20 options. In response to the selection of a transaction by the consumer, a second selection signal is generated. Finally, based upon the second selection signal and the electronic information about the consumer, the selected transaction may be effected.

25 In one embodiment, the electronic information comprises the name of the user, the address of the user, the account balance and/or the credit history of the user.

A further understanding of the nature and advantages of the present invention may be realized by reference to the  
30 remaining portions of the specification and the drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

35 Figs. 1-7 are various views of a first kiosk designed according to the present invention;

Fig. 8 is a functional block diagram of one embodiment of the present invention; and

Figs. 9a and 9b are portions of a flow chart illustrating a method of previewing product information and effecting a transaction according to a specific embodiment of the present invention.

5

#### DESCRIPTION OF SPECIFIC EMBODIMENTS

Figures 1 through 7 illustrate one embodiment of a product preview system designed according to the present invention. The figures depict a kiosk in various isometric views.

The invention herein is described primarily with regard to the presentation of previews of computer software products and services, but it will be understood that the invention may be employed to preview a wide variety of products and services. For example, the invention herein could be used to present previews of financial, travel, or entertainment related products and services. Further variations in the operation and application of the present invention will be apparent to one of ordinary skill in the art.

The preview system is preferably mounted, at least in part, in a kiosk structure. The kiosk structure may be constructed of a wide variety of materials including, for example, plastic, wood, metal, fiberboard or the like. The kiosk is provided with a keyboard area and a video display area. Recessed into the kiosk are also speakers for presentation of the audio portion of a selected preview. In alternate embodiments, the audio and video display portions of the system may be separate from a remotely located kiosk or console.

In a specific embodiment, the preview system employs a keyboard which includes a translucent sheet or sheets of plastic. The keyboard may be illuminated from behind, and is divided into an array of product illustration regions which contain symbolic representations of financial products or services. In Figure 1, the selection keyboard shown has space for an array of about 100 product images. However, it will be



understood that any desired number of selections may be presented to the user. When desired, the keyboard illumination for a particular selection may be selectively toggled when the corresponding audio-visual presentation is being displayed.

In operation, a consumer approaches the kiosk, views the array of product or service related information available and indicates a selection by depressing the keyboard at the location of the desired selection. Within a few seconds, the preview system presents a product preview comprising audio and full-motion video portions. Once the consumer has previewed the product information, she may then insert a magnetically coded card, such as a credit card, a bank debit card, or a PICS Previews access card into the apparatus, enter her personal identification number (PIN), and select a transaction with regard to a specific product. As described above, in alternate embodiments, the consumer may present a driver's license or business card to be read by an optical scanner, thereby providing the system with the requisite personal information. Available transactions might include a request for promotional material regarding the product to be sent to the consumer's address, a request for a printout of promotional information, or an immediate purchase of the featured product. Alternatively, the consumer may insert the magnetically coded card prior to viewing product information.

Another feature of the system operation involves the "attraction" of a user to the kiosk through the display of promotional information in a predetermined manner when a given kiosk is not in use. In accordance with the present invention the system displays an ordered sequence of audio-visual selections according to input factors such as location, time of day, and available product inventory. Predetermined numbers of individual selections may be directed to display in a continuous sequence, or in a random manner. Further, the sequences themselves may be ordered in a predetermined manner. The attract mode is enabled after a predetermined time during which the system has not received user input.

The preview system of the present invention is able to effectively process the data required for full-motion video in part due to the incorporation of data compression techniques in data storage and retrieval. In a specific embodiment data compression algorithms are used in combination with the user interface and computer system components as described herein to enable full-motion play, and fast retrieval of compressed digitally stored data. In one embodiment, a Digital Video Interface ("DVI") board is used as an interface between the system storage medium, a CD-ROM, and the system processing means, a personal computer (PC). The DVI board is available from at least two vendors. As an alternative to DVI technology, MPEG technology may also be employed to facilitate fast retrieval of digitally compressed data.

In one embodiment, the system is capable of displaying textual character information on the video display simultaneously with a full-motion video selection. The display of text is enabled by the incorporation of a VGA board and the ability of the DVI board to merge text and graphics from the VGA board with full motion video from the CD-ROM drive.

Figure 8 provides an overall block diagram of the electronic components of the preview system. The system is managed and controlled by a digital computer 14 which may be, for example, an IBM PC compatible computer, preferably equipped with a VGA card 16 of the type known to those in the art. While the invention is illustrated herein by way of reference to the use of a personal computer for management of the system, it will be apparent that a wide variety of digital processing devices could be used without departing from the scope of the invention herein. For example, a wide variety of microprocessors or even discrete logic could perform many or all of the functions disclosed herein.

PC 14 is connected to a custom I/O controller board via a 25-pin M/F connector. The audio output of the DVI board in the PC is also connected to the custom I/O controller via a mini stereo plug. When directed by PC 14, the custom I/O

controller polls a keyboard 6 for input from a consumer via the 25-pin connector. The system may alternatively scan keyboard 6 using a keyboard controller of the type well known to those skilled in the art (such as those found in conventional personal computers). Such a keyboard controller would provide information to PC 14, indicating which, if any, of the keypads is depressed at a given time.

The custom I/O controller is used to transmit control information to and receive control information from the PC. Video output from PC 14 can be provided directly to a standard VGA monitor, or can be provided to other types of monitors by incorporating a scan converter. A scan converter receives input signals from PC 14 and outputs video signals to video monitor 34 via an RCA connection 101. Audio outputs from PC 14 are amplified by the custom I/O controller.

In a specific embodiment of the present invention, PC 14 is equipped with a Digital Video Interactive ("DVI") board 32 and a VGA board 16. VGA board 16 and DVI board 32 are connected via a 26 pin ribbon cable. PC 14 is also equipped with a CD-ROM Drive 42. CD-ROM drive 42 is connected to the DVI board via a 50 pin ribbon cable. It will be understood that CD-ROM drive 42 is only one of many types of storage media which may be employed to store all or part of the audio and full-motion video information. For example, hard disk 36 may be employed in this capacity, either alone, or in combination with CD-ROM drive 42. Ultimately, any medium, or combination of media, suitable for storing audio and full-motion video may be used for this purpose.

In a further embodiment, PC 14 also employs a modem 50 to allow connections via phone line to a remote location 60. Communication with the preview system from remote locations may serve several purposes. For example, in some circumstances, it may be desirable to track user selections at specific retail locations. Such information may be useful to adjust the inventory. Such statistics may also provide valuable marketing information

Communication with the kiosks may also enable "targeted text" messages to be sent via modem from an off-site

location to the kiosk system. The messages would preferably be stored on writable storage means in the kiosk, such as, for example, hard disk 36 within PC 14. According to the present invention, the messages correspond to one or more  
5 predetermined product or service selections, and when such selections are chosen by a consumer, the text messages are retrieved from the storage means and overlaid onto the video output display via scan converter 102. Typical messages include current information regarding the selected product or  
10 service. Connection via modem to an off-site location may further be utilized to load updated data and other information to specific kiosks, or all kiosk locations. Data constituting a new display array of products offered, in which certain of the products are deleted or added from prior versions may be  
15 loaded from an off-site location.

Audio outputs are provided to Kiosk speakers from the custom I/O controller via a custom cable harness. Audio outputs can also be provided to television speakers from the custom I/O controller via standard RCA plugs.

20 The preview system is also equipped with a magnetic card reader 104 of the type used in, for example, automated teller machines. Magnetic card reader 104 comprises a port in which a card having magnetically recorded information stored in a magnetic stripe may be inserted. At least one magnetic  
25 sensor translates the magnetically recorded information into electronic information which is then processed by PC 14. There are several well known types of magnetic sensors, or transducers. In one form, a magnetic transducer comprises a ring-shaped electromagnet with a gap which faces in the  
30 direction of the magnetic stripe. The electromagnet comprises an inductive coil wrapped around a magnetic core. When the magnetic stripe passes over the gap in the electromagnet, magnetic flux emanating from the stripe is intercepted by the core, thereby inducing a voltage in the coil proportional to  
35 the rate of change of the flux and representative of the magnetic information recorded in the magnetic stripe. Other types of sensors may also be used to read magnetic information, such as, for example, magnetoresistive and Hall

effect transducers. Magneto-optical techniques may also be utilized in this regard.

In response to the insertion of a magnetically encoded card into magnetic card reader 104, PC 14 performs such tasks as verification of a personal identification number entered by the user, retrieval of personal and account information of the user by means of modem 50, recordation and transmission of transactions to remote locations, such as, for example, a financial institution.

Alternatively, information about the consumer may be entered via an optical scanner 104 (in place of magnetic card reader 104). Optical scanner 104 may read visual information from a variety of sources such as, for example, the consumer's driver's license or business card.

Finally, the preview system may include a printer 106 by which the user may obtain printouts of promotional and informational materials at the kiosk location.

Figs. 9a and 9b are portions of a flow chart illustrating a method of previewing product information and effecting a transaction according to the present invention. According to a specific embodiment of the present invention, the user initiates the sequence by viewing the preview selections, and indicating a choice. After an initialization step 200, the program loops through reading the keyboard at step 201. If a key was pressed at step 202, the process then proceeds to step 210 for diagnostics. Otherwise, the process proceeds to step 203, to determine whether the system is in a video play mode.

At step 210, if the current mode is DIAGNOSTICS, the system is then directed to handle the diagnostics represented at step 217. Otherwise, the process proceeds to step 211.

At step 211, if the key pressed is between 1 and 99, the system searches for the digitally stored track, decompresses the selected data stored on the track, and then plays the combined video and audio presentation at step 216.

If the key pressed is not between 1 and 99, the system process proceeds to step 212, at which the system queries whether a particular switch, for example, a colored

Button #1 representing a store employee control function was pressed. If this is the case, the system displays the first diagnostics screen, represented by step 215. Otherwise, the process proceeds to step 213. Similar to step 212, at step 5 213, if, for example, a colored Button #2, representing repair technician control function was pressed, the system then displays the second diagnostics screen indicated as step 214.

Referring again to step 203, the system queries whether a video is currently playing. If so, the system 10 maintains playing that video, as represented by step 209. If a video is not presently playing when queried at step 203, the process proceeds to step 204.

At step 204, the system asks if the attract count is 0 or 4. If so, the system then plays a random attract video 15 and sets the attract count to 1 (steps 207 and 208). Otherwise, the system plays a random video and increments the attract count, as indicated by steps 205 and 206. At the conclusion of any of the above steps, the process loops to step 201 (indicated by the asterisk).

20 The flowchart of Fig. 9b illustrates a method of effecting a transaction according to a specific embodiment of the present invention. The flowchart begins at the same initialization step 200 as the flowchart of Fig. 9a and operates in parallel therewith. At step 221, PC 14 reads the 25 output of the magnetic scanner. If a user inserts a magnetically encoded card into the magnetic scanner, the system prompts the user to enter her personal identification number (PIN) (step 223). If a card is not inserted, the system continues to monitor the magnetic scanner output. 30 Additionally, if the user does not enter her PIN within a programmable period of time, the system resumes monitoring the magnetic scanner output (steps 225 and 226). Once a number has been entered, the system verifies that the entered number matches the PIN encoded on the card (step 227). If the 35 entered number does not match the PIN, the system notifies the user that the number is invalid and resumes monitoring of the magnetic scanner output (step 229). If the number is valid, the system retrieves information about the user, like, for

example, name, address, and, in some embodiments, account information (step 230). The system also prompts the user to enter a transaction option. The system then monitors the transaction option keypad (step 231) and executes a transaction if one is selected by the user (step 235). If a transaction is not selected within a programmable period of time, the system resumes monitoring the magnetic scanner output (steps 233 and 234).

The present invention provides a greatly improved method and apparatus for displaying audio and associated full-motion video previews. While the invention has been particularly shown and described with reference to specific embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in the form and details may be made therein without departing from the spirit or scope of the invention.

WHAT IS CLAIMED IS:

1. An apparatus for previewing product information and effecting a transaction, comprising:

5 storage medium for storing audio and full-motion video information about a plurality of products;  
means for displaying the audio and full-motion video information coupled to the storage medium;

10 a decoder for reading information presented by users;

a user interface including:

means for selecting a first product option from a plurality of product options; and

15 means for selecting a first transaction option from a plurality of transaction options;  
a data link for transmitting information to and from an external data system; and

20 means for processing information entered by means of the decoder and the user interface, and transmitted from the external data system, the processing means being coupled to the storage medium, the display means, the user interface, the decoder, and the data link.

25 2. The apparatus of claim 1 wherein the storage medium comprises at least one compact disc read-only-memory (CD ROM).

30 3. The apparatus of claim 1 wherein the displaying means comprises at least one video monitor and at least one audio speaker.

4. The apparatus of claim 1 wherein the decoder comprises a magnetic card reader.

35 5. The apparatus of claim 4 wherein the magnetic card reader reads magnetically coded information from credit cards and debit cards.



6. The apparatus of claim 4 wherein the magnetic card reader reads magnetically coded information from PICS Previews access cards.

5 7. The apparatus of claim 1 wherein the decoder comprises an optical scanner.

10 8. The apparatus of claim 1 wherein the means for selecting a first product option comprises a first plurality of touch sensitive graphics, each graphic being a symbolic representation of a product option.

15 9. The apparatus of claim 8 wherein the first plurality of touch sensitive graphics are backlit.

10. The apparatus of claim 9 wherein the symbolic representations represent computer software products and services.

20 11. The apparatus of claim 9 wherein the symbolic representations represent financial products and services.

25 12. The apparatus of claim 9 wherein the symbolic representations represent travel products and services.

13. The apparatus of claim 9 wherein the symbolic representations represent entertainment products and services.

30 14. The apparatus of claim 1 wherein the means for selecting a first transaction option comprises a second plurality of touch sensitive graphics, each graphic being a symbolic representation of a transaction option.

35 15. The apparatus of claim 14 wherein the second plurality of touch sensitive graphics are backlit.

16. The apparatus of claim 15 wherein the symbolic representations comprise sending information to the user's

address, printing information, and purchasing products and services.

17. The apparatus of claim 1 further comprising  
5 means for entering a personal identification number, wherein the means for entering a personal identification number comprises a third plurality of touch sensitive graphics, each graphic comprising at least one alphanumeric symbol.

10 18. The apparatus of claim 17 wherein the third plurality of touch sensitive graphics are backlit.

19. The apparatus of claim 1 wherein the external  
15 data system comprises a data base containing consumer information which may be accessed by the processing means by means of the data link using the information presented by the user.

20 20. A method for previewing product information and effecting a transaction, the method comprising the steps of:  
presenting a user with a plurality of product options;

generating a first selection signal in response to a selection of a first product by the user;

25 displaying an audio-visual presentation about the first product in response to the first selection signal;

generating a first scanning signal in response to a presentation of information to a decoder by the user;

30 obtaining electronic information about the user in response to the first scanning signal;

presenting a user with a plurality of transaction options;

generating a second selection signal in response to a selection of a first transaction by the user; and

35 effecting the first transaction in response to the second selection signal and the electronic information.

21. The method of claim 20 wherein the first scanning signal is generated in response to the insertion of a magnetically encoded card into a magnetic card reader.

5 22. The method of claim 21 wherein the magnetically encoded card is selected from the group consisting credit card, bank debit card, and PICS Preview access card.

10 23. The method of claim 20 wherein the first scanning signal is generated in response to a presentation of a card having visual information thereon to an optical scanner.

15 24. The method of claim 20 wherein the product options comprise computer software products and services.

25 25. The method of claim 20 wherein the product options comprise financial products and services.

20 26. The method of claim 18 wherein the product options comprise travel products and services.

25 27. The method of claim 20 wherein the product options comprise entertainment products and services.

30 28. The method of claim 20 wherein the electronic information comprises name of the user, address of the user, account information of the user, and credit history of the user.

35 29. The method of claim 20 wherein the transaction options comprise sending product information to the user's address, printing product information, and purchasing products and services.

30. The method of claim 20 further comprising the steps of:

generating a personal identification signal in response to a personal identification number being entered by the user; and

verifying the personal identification number in response to the personal identification signal.

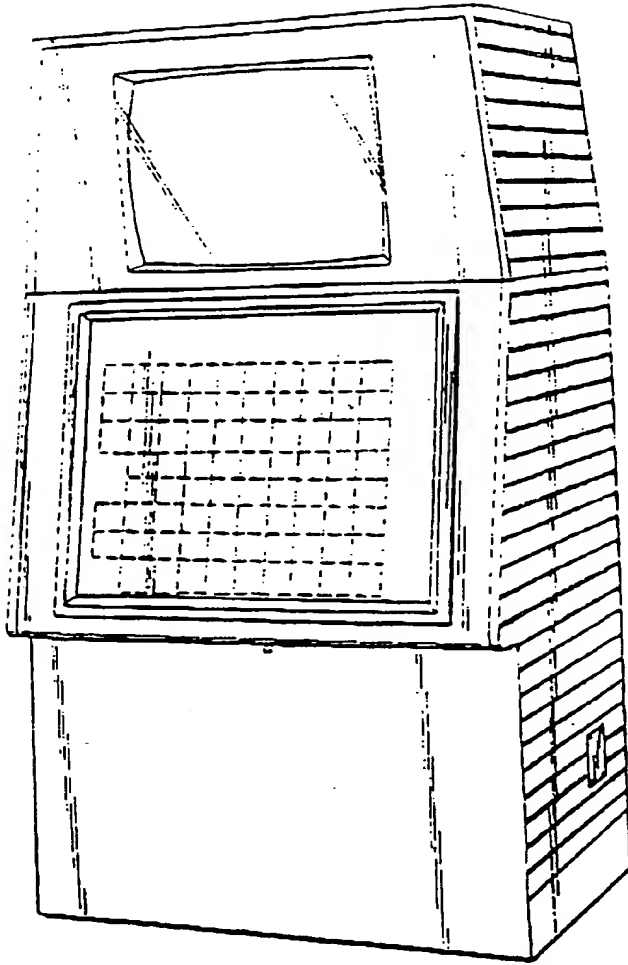
31. The apparatus of claim 1 wherein the storage medium comprises a hard disk.

32. The apparatus of claim 1 wherein the storage medium comprises:

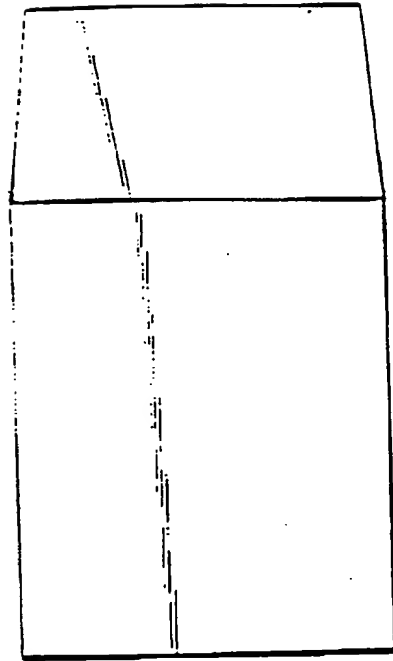
at least one compact disc read-only-memory (CD ROM);

and

a hard disk.



**FIG. 1.**



**FIG. 7.**

2 / 5

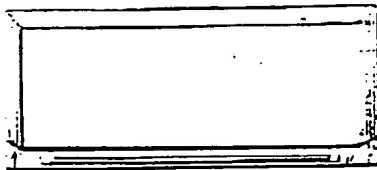


FIG. 2.

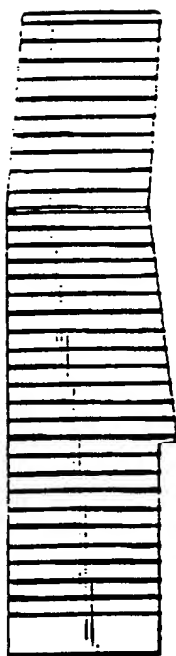


FIG. 5.

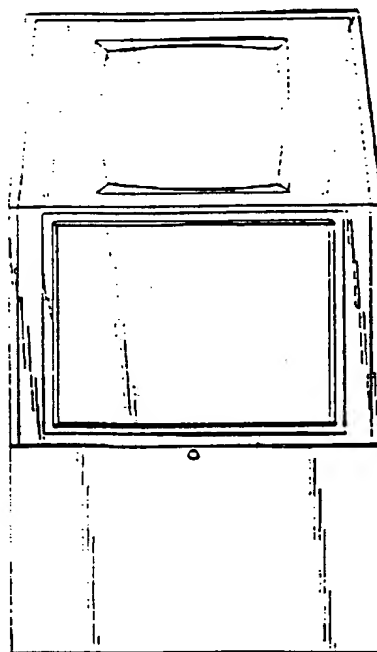


FIG. 3.



FIG. 4.

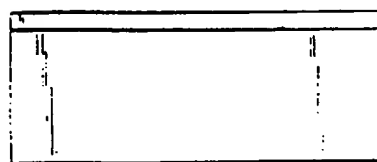


FIG. 6.

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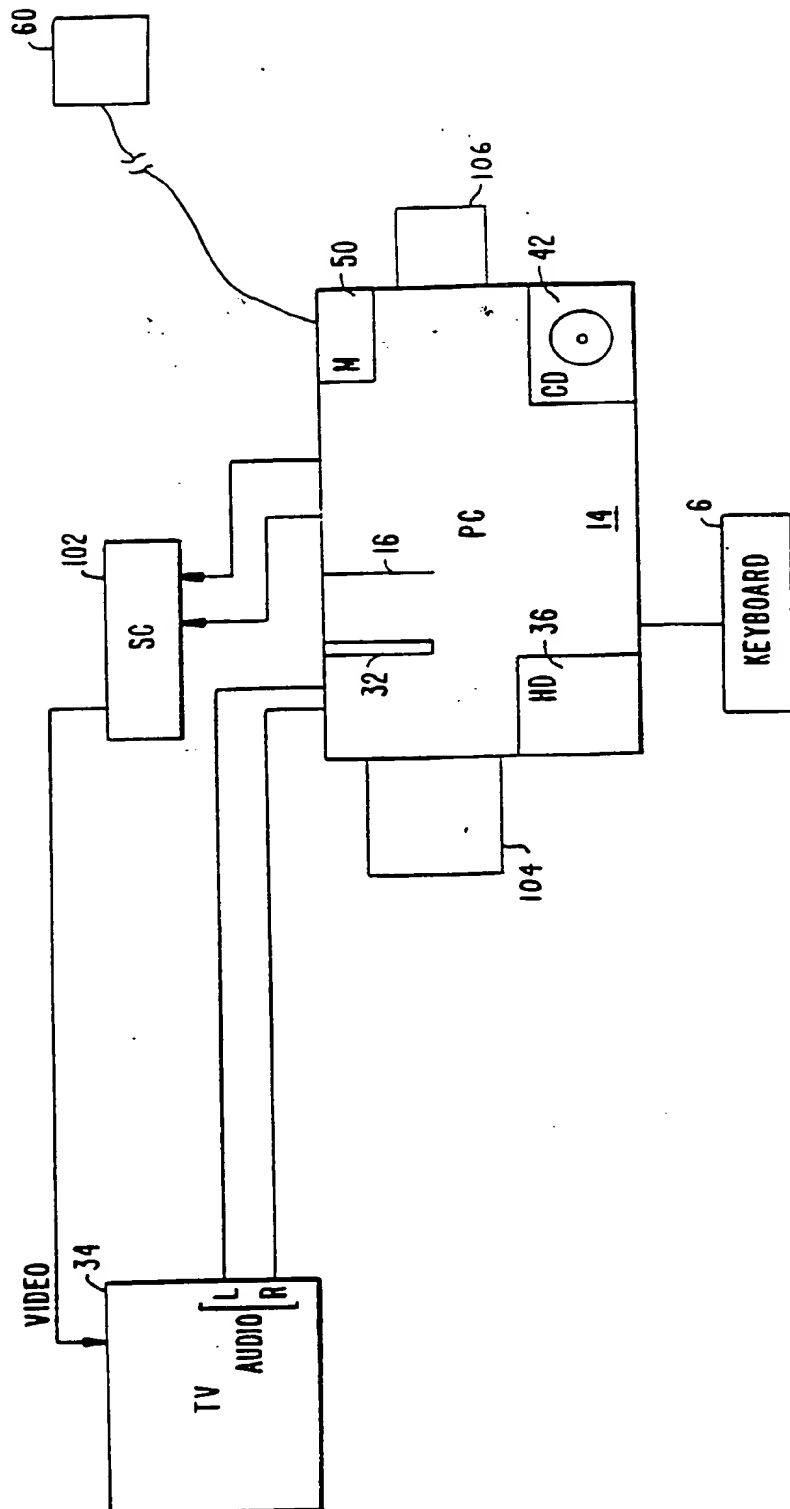
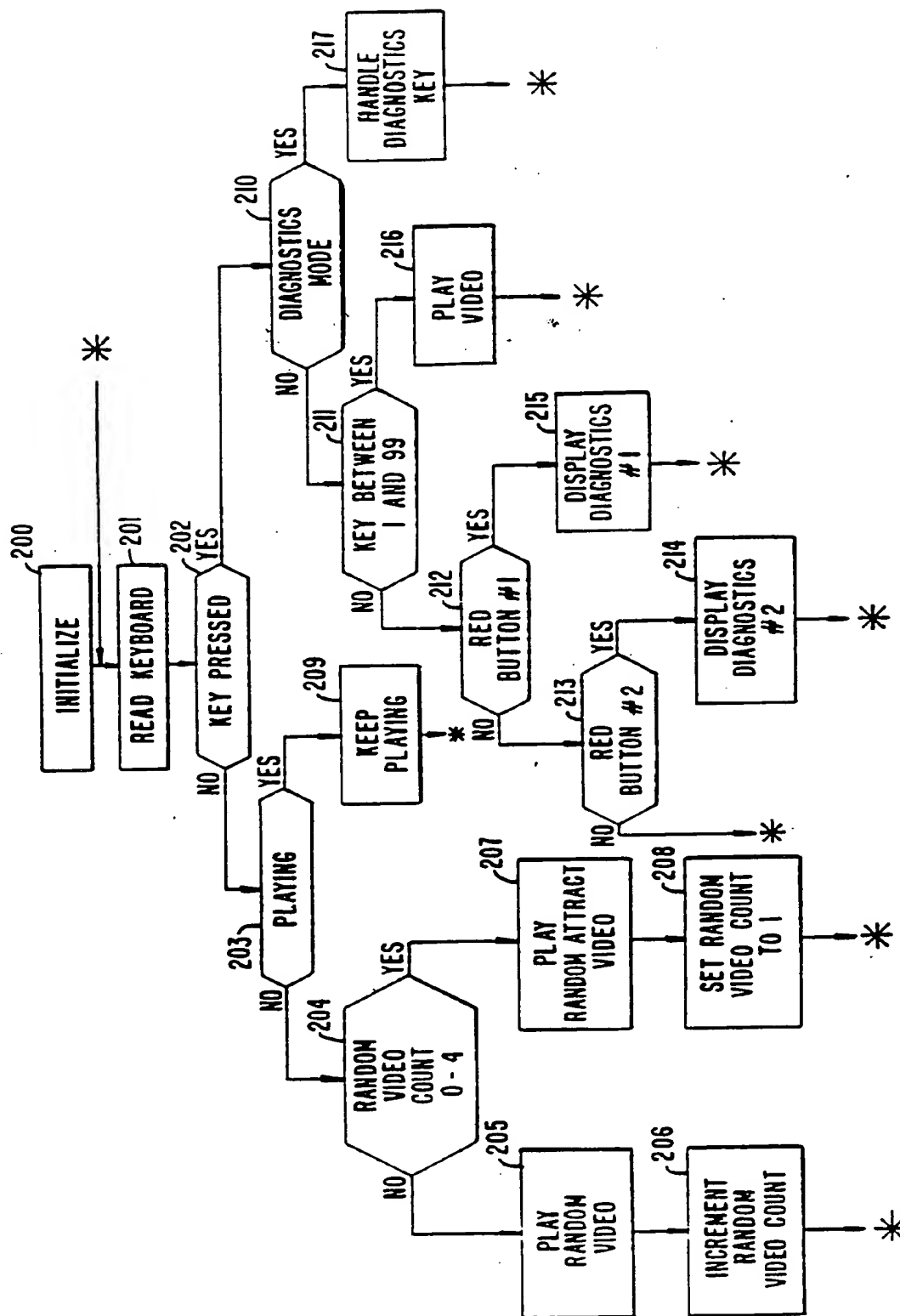


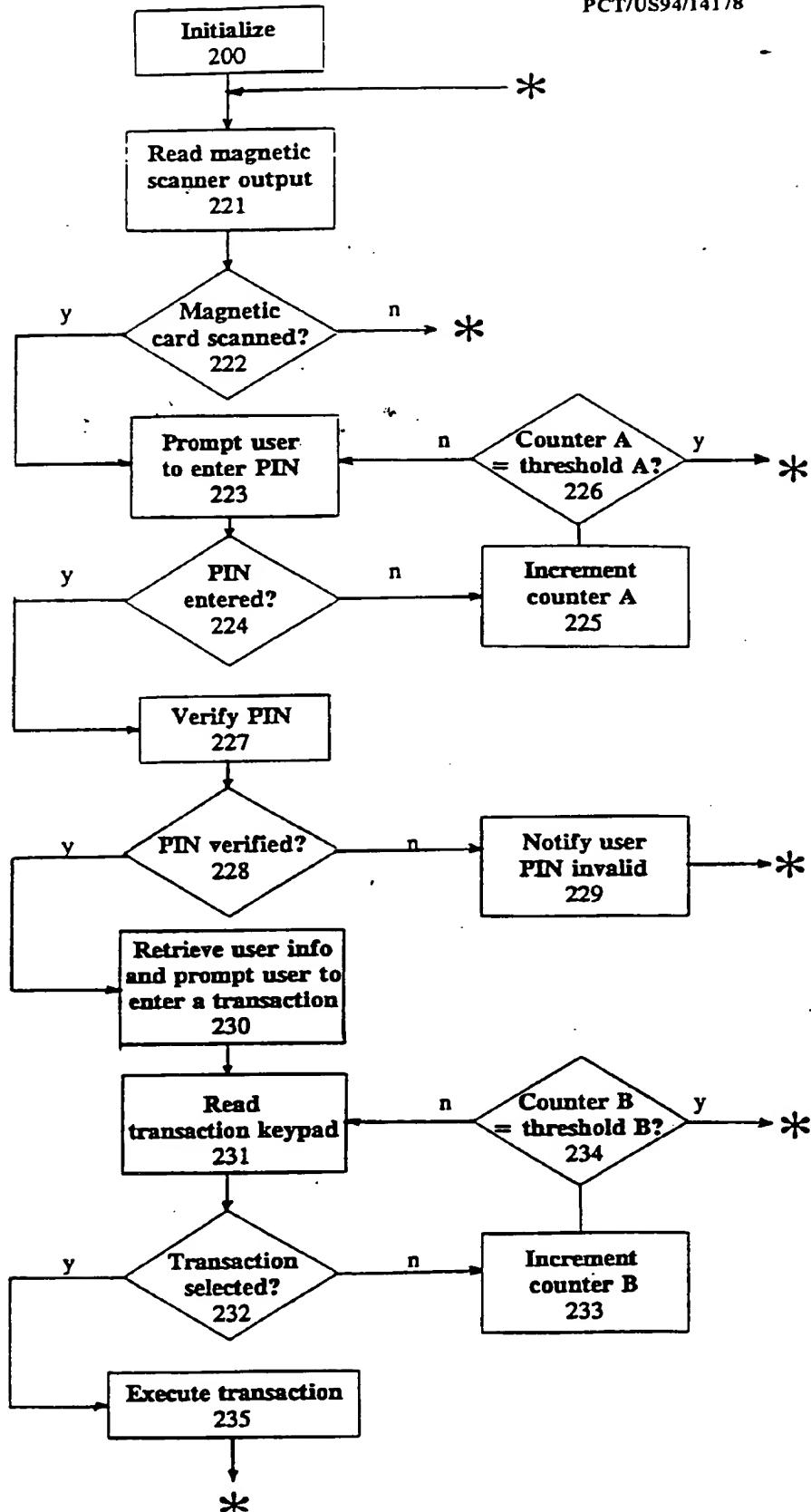
FIG. 8



**FIG. 9a**



Fig. 9b



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US94/14178

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) : H04N 5/76, 5/781

US CL : 358/342, 341, 343

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 358/335; 360/19.1; 455/5.1; 235/375; 348/7

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NONE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,237,157 (KAPLAN) 17 August 1993, the whole document.	1-32
Y	US, A, 5,027,400 (BAJI et al) 25 June 1991, columns 20-22.	1-32
Y	US, A, 4,675,515 (LUCERO) 23 June 1987, the whole document.	1-32
Y	US, A, 5,084,768 (STERN et al) 28 January 1992, columns 1-6.	1-32

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Date of the actual completion of the international search

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